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is scarcely audible. Consider an example which might suggest itself as not a case of mind at all and yet as a case of mind by definition. The point of view of the Martians and that of ourselves conceivably conflict. Suppose their foremost speculative physicist, whom we may refer to familiarly as Skygad, does not agree with Einstein concerning the nature of mass. Is it fair to call this difference of view, the combined divergence Einstein-Skygad, a group-mind? I should answer, Yes. And why do we hesitate to call it a case of mind? Not because each view is unconscious of its opponent view. Conflicting views abide in any mind without consciousness that they conflict. We hesitate to call the conflict of our own view and the Martian view a case of mind because there seems no *practical* prospect of a reconciliation. It is here that reason sleeps and progressive reconciliation of the conflict seems essential to the being of mind. But *mens semper cogitat,* if it be true, requires interpretation.

I recall having seen long ago a cartoon representing this same Skygad on visit to the planet where we find ourselves. Accident had led him to a chess resort and he was making an entry in his diary: "Came upon two strange earth-beings in dispute regarding a set of diminutive idols. First one and then the other demanded some special arrangement of the idols; after which each one lapsed into sullen silence." It is clear that the Martian regarded such employment as serving no fair end. His own view and that of the chess enthusiasts did not conform. Who shall say what each might not have gained through a sympathetic understanding of the other!

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THE NEED OF A NEW ENGLISH WORD TO EXPRESS RELATION IN LIVING NATURE

PART II

III

THE RELATION BETWEEN PARTS IN THE INDIVIDUAL

The particular parts to be requisitioned for this illustration are the muscles and the nerves of animals. On the basis of hundreds of anatomical and physiological investigations made during the last half century especially, we are now able to state the relation between these parts in the following way: (*a*) From the functional standpoint, the dependence of muscular mechanism upon neural mechanism and of neural mechanism upon muscular mechanism is such that neither could have any activational value to the organism without the other; (*b*) from the originative and developmental standpoint, the dependence of each of these mechanisms upon the other is such that neither could have come into being at all without the other.

It has of course long been one of the commonplaces of physiology that all ordinary muscular action is incited by, and consequently is so far dependent upon, stimuli reaching the muscles through the nerves. But various facts, such as that of the ready response of muscle to direct stimulation, *i.e.*, stimuli applied experimentally to the muscle itself instead of to the nerve going to the muscle, permit or even encourage us to conceive the contraction of muscles to be an operation due solely to the nature of the muscles themselves, the nerves playing merely some such secondary part as that of determining just when or under what particular circumstances contraction shall take place. If, for instance, a muscle will contract as well in response to a direct pinch or a directly applied electric current, as to these stimuli coming to it by way of a nerve, why may we not suppose that the nerve's part in the business is really rather incidental?

Well, for one thing, but little reflection is required to recognize that the fact that a muscle can be made to contract by sending an electric current through it does not prove much about its original and inherent ability to contract; nor does contraction thus induced give much clue to the question of whether other kinds of stimuli may also induce contraction. That a gun may be discharged by applying an electric spark to the powder, proves a little something, but really very little, about the explosive nature of powder.

It is only through great study of both the activational relation between mature muscle and nerve, and of the origin and development of these in the individual and in the whole animal series, that true insight into the nature of the relation between them is reached.

The evidence in the case is altogether too voluminous and intricate to be detailed here. Only results can be given and these in the most concentrated form possible. The matter reaches through the whole gamut of structure and activity in the animal world, from the most elaborate and refined operations of civilized man, to the crudest, simplest movements of creatures, like sponges, near the bottom of the scale. The simplest phase which we shall touch is that of the *reflex arc.*

The conception of this structure is now so well established in physiology and psychology that the merest outline of what it is will suffice. The two most essential elements in it are an inwardly placed contractile cell (basis of muscle), known as the *effector,* and a more superficial, sensory cell (basis of sense organ), for contact with the outside world, known as the *receptor*.[2] At their simplest, effector and receptor are in contact with each other. But more commonly by far, at least one other element in the form of an elongated cell intervenes between the two, this being known as the conductor or adjuster, since its office is to conduct the stimulus from receptor to effector. Although this third element is readily seen to be quite secondary in importance when the reflex arc is viewed at this low level of its evolution, yet it comes to be of very great importance in the most highly developed animals, especially in man. Indeed, so prominent is it here that it really constitutes the "nervous system" as this is wont to be understood. Too frequently for clarity of understanding the nervous system and the sense organs are spoken of as though they were not fundamentally and indispensably parts of one and the same system.

But this implication of possible dissociation of receptors from conductors (sense organs from nerves) contained in much of common physiology is less pronounced and less unfortunate than the implication of dissociation of effectors (muscles) from receptors as well as from conductors. In truth, the basal fact that effector, receptor and conductor really constitute a system, one and inseparable, is seriously obscured in the common thought and language pertaining to the muscular and neural mechanisms, particularly of higher animals. But that such is the fact is seen to be in the highest degree probable once the whole subject is viewed from a standpoint that is as rigorously synthetic as it is analytic.

Rectification of these defective teachings is gradually coming about—more slowly, I imagine, than would be the case but for the circumstance that the relevant truths lie in fields so far apart as to make it difficult for students in any one of them to know much about what is going on in the others.

Prohibitive of great detail as is my aim in this article, yet I must refer to a few of the investigations which bear particularly on the point now occupying us.

The first to be touched will be the work of G. H. Parker on the nervous system. Tellingly significant is the circumstance that Parker's observations appear to leave him no alternative, when it comes to choosing a single word with which to designate the mechanism fundamental to all higher animal activity, for some word that will refer to both effector and receptor elements, that is both motorial and sensory elements. The term actually used is *neuromuscular,* written as a single word, its two parts not even separated by the hyphen. Thus we find in his recent book, *The Elementary Nervous System,* numerous phrases similar to the following: "that final type of neuromuscular organization that is characteristic of the highest animals, and in which a central nervous organ or adjuster is well differentiated," p. 203.

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[2] For the purpose of this discussion it will be permissible to use the term effector as though it had reference to muscular phenomena alone. That, however, such is not really the case must not be lost sight of. Glands, for example, are likewise effectors and exceedingly important ones, though the present aims do not require attention to them.

Perhaps the most important of Parker's many additions to the sum total of information in this field are his observations on the movements and the mechanism involved therein, of sponges. Until a few years ago the usual teaching was that these lowly animals are entirely without nerves or muscles and consequently have no power of movement, excepting that made by the cilia, so well developed in certain of the cavities peculiar to the creatures. But Parker shows, in confirmation and important extension of affirmations previously made by a few observers, that a certain measure of contractility, especially for closing the orifices, is possessed and regularly performed by all the sponge species examined by him.

Nevertheless, his search for nerves proved as little successful as had that made by other students. As to muscles, he found, as a few other zoologists had, certain cells, especially around the main or discharge orifice, that are contractile and hence may be regarded as "in the nature of primitive muscles."

A point of special interest is the fact that while cells which deserve the name "primitive muscles" are present, no cells accompany them to which the name primitive nerves can be applied. In other words, recurring to the nomenclature of the reflex arc, we have here one element only, the effector, of this basal structure. "Sponges may be said," Parker writes, "to have among their cell combinations effectors, but no receptors or adjusters" (p. 49). And this conclusion leads him to give special attention to the subject of "independent effectors," not only in sponges but in certain parts of higher animals, as for example, in the pupil-narrowing mechanism of the eye. Even in the human eye the muscle fibers involved regularly act partly from direct stimulation, *i.e.,* as independent effectors.

But now comes the important query, in what sense are these "independent effectors" independent? Is their "effecting" (contracting) independent in the sense that no "recepting" and "adjusting" (stimulating and conducting) at all are involved? Does contraction take place just from its own inherent ability so to do and with no external influence whatever operating thereto? Parker's observations furnish just as conclusive proof that this is not the sense in which the effectors are independent, as that they are effectors at all. The contraction depends upon stimulation quite as indubitably as do those in other animals where receptors are present. Whether the exit orifice of the sponge shall remain open or close up depends upon whether the water in which the animal lives is in motion or is still. The stimulus appears to be mechanical and of the character indicated. Nor is the power of conducting injurious stimuli wholly wanting in the animals, as the experiment shows. "It would be quite erroneous," Parker says, "to ascribe to these animals a complete absence of transmission" because they possess these independent effectors (p. 47). And further, "in many tissues a sluggish transmission, unaccompanied with observable motion, and, therefore, nerve-like, is beyond question" (p. 48). Such transmission he calls *neuroid.*

The truth seems to be that in sponges the effectors are their own receptors, and are also conductors to some extent. They are independent only in the sense that stimulation (reception) does not for them depend on *other elements* than themselves. They are not independent in the sense of not being dependent on stimulation from contact with outside bodies.

All this points back unmistakably to the now universally held view that protoplasm, no matter how little developed, is in its very nature responsive to stimuli, this responsiveness consisting, for one thing, in the phenomenon of contraction.

A highly significant thing about this work of Parker's is its bringing into clear light the fact that in the evolution of the neuromuscular mechanism as we find it in its elaborated state among higher animals, the motorial aspect of protoplasm seems to lead the way as one may express it, so far as visible structure is concerned. But actually we are probably obliged to assume that the stimulative, or irritative, or sensitive aspect is likewise fundamentally involved. Stating the matter in his own language we have: "They [sponges] possess the original and most ancient of its [the neuromuscular mechanism] constituents, muscle, around which the remainder of the system is supposed subsequently to have been evolved" (p. 49).

Thus it is that zoology traces action in the form of motion identical as to kind with that distinctive of the commonest of creatures almost to the doorsill of animal life. Nor will it do to lose sight of the fact that hand in hand with this expanding perception of the place of action in animal life, has gone perception of the dependence of such action on contact with the external world resulting in the phenomenon known as sensation, or stimulation. What tremendous meaning this is seen to have when its accordance is recognized with whatever is truly vital in the formal philosophy and psychology of our day!

But the cardinal point for us is this: the germ itself, as we may call it, of animal activity has a measure of diversity, but also of togetherness, both as to structure and as to function. There is something of differentiation and likewise of conferentiation at the very start off, so far as observation can ascertain. And every stage of development, from this low level to the very highest, including the conscious life of civilized man, presents this same diversity and togetherness for the business of living. Action, motion is accomplished by structure seemingly always contractile, in the vast majority of cases the contractility being of the sort called muscular. And everywhere this is dependent on other kinds of structure called irritable or sensory, in its nature the very antithesis of muscular motility.

Reverting now to our remarks about the nomenclature of development, we find that the definition of the particular animal development with which we are concerned would be: All progressive development in the motor aspect of animal life involves passage from *a state in which the differentiation and conferentiation of the effector-receptor system are less complete, to one in which such differentiation and conferentiation are more complete.*

This development does not consist in differentiation of effectors and receptors which somehow get together, more or less by chance, after having been independently produced; but, as said in general terms some pages back, the two, the differentiating and the conferentiating, go on in mutual or reciprocal dependence, even though the former may in some instances a little precede the latter in time. Although, as is well known, there is very much of secondary coming into contact of nerve cells with nerve cells, nerve cells with muscle cells, nerve cells with gland cells, and so on, in the ontogeny of higher animals, the evidence taken all together requires us to suppose that in all cases such independence of origin and secondary conjunction are the expression of developmental tendencies coming down by heredity from ancestral conditions in which such structural independence did not exist.

And we must not fail to note what this mutually generative dependence means in a specific instance as to the nature of each element. The nature of a muscle must be to some extent dependent upon the nature of its nerve or nerves; and, reciprocally, the nature of a nerve must to some extent depend upon its muscle. While muscle is indubitably muscle, and nerve is indubitably nerve, each acts in some measure determinatively upon the other. In the purely anatomical-physiological aspect of the reflex arc, I am quite sure the conclusions here stated answer the general requirement of an adequate conception of that structure formulated by John Dewey twenty-five years ago. He wrote: "What is needed is that the principle underlying the idea of the reflex arc as the fundamental psychological unity shall react into and determine the values of its constituent factors," ("The Reflex-Arc Concept in Psychology," *The Psychological Review*, Vol. III, 1896, pp. 357–370).

It is highly probable that this reciprocally determinative action of muscle and nerve does not pertain merely to the gross structure and action of each, but extends to their chemical composition and action. This aspect of the subject I touch even more lightly than I have the anatomical-physiological aspect, though a reference to it seems indispensable. And this brings me to another of the fields of investigation mentioned some time ago as contributing in special degree to the conception of relation between muscle and nerve (effector and receptor) here outlined. I refer to the work of C. M. Child on what he calls axial gradients in organisms.

The fundamental conception here is that in an organism or definitive part of an organism, which develops any kind of an axis, as by becoming longer than broad, this axis is accompanied by, or is an expression of, a differentiation, or gradation, along the axis in the metabolism of the organism or part; this metabolic differentiation, or gradient, being in turn accompanied by, or an expression of, susceptibility of the organism or part to varying environmental influences.

Such differentiations or gradients occur in the lowest, simplest organisms, as in hydroids and algæ, even in single cells of these the protoplasm of which is but slightly differentiated, and is not restricted to organisms having well established tissues and organs. What in this is particularly relevant to our discussion is the differentiation in susceptibility to external influences as a seemingly necessary concomitant of development, this manifesting itself in a variety of structure and activities. But to stop with attention to the differentiation would be to stop with the story half told. The differentiation is significant only as it appertains to an organism, or at least to some part or member of an organism *as a whole*—as a space-occupying, time-enduring body.

In other words, the purpose of the differentiation, namely, the preservation and development of the organism or part, is realizable only through being accompanied by its appropriate—what shall we call it? Integration is the term used by Child, this being conform-able with common practise. "Physiological polarity [differentiation] and physiological integration or individuation" he believes are illuminated by the recognition of susceptibility gradients. But is it not clear that the usual implication of *integration* makes this word a bad fit for the phenomenon here needing expression? Certain it is that the physiological poles (differentiations) referred to are not things that have been produced independently of each other and then secondarily brought together. Complete severance of them from each other would mean the destruction of the organism or part, and might very well result in their disintegration; but this would surely be something very unlike their differentiation. So in this case likewise, I submit, "physiological conferentiation" would be a truer word mate for physiological polarization than is physiological integration. In his very recent book, *The Origin and Development of the Nervous System* (University of Chicago Press, 1921), Child has gone far toward showing the connection between the gradient idea and the full-fledged nervous system through the reflex arc.

The only other set of researches that I appeal to now in support of my view of relation among the elements of the neuromuscular mechanism are those of Chas. S. Sherrington, as set forth in *The Integrative Action of the Nervous System.*

By considerations entirely similar to those already presented, I would maintain that in nearly every instance in which the author uses the word integration and its modifications, conferentiation and its modifications would be a better because a truer term.

The "integrative action" of the nervous system may undoubtedly be correctly regarded as an action which saves the system from disintegration. But such a conception of the action surely falls far short of the main phenomena so well exhibited by Sherrington. The action which he has in mind concerns the deepest nature of the nervous system, not only as to the functioning of the mature system, but as to the coming of it into existence.

Even a mere allusion like this to Sherrington's work must not neglect to mention that the central idea in it is not the relation of the nervous system (receptor-conductor system) to the muscular (effector) system, but rather the relation of the parts of the nervous system to one another. The muscles are treated more from the standpoint of means of discovering the relations among the nerves, than as parts coordinate and reciprocal in importance with the nerves. From this standpoint Sherrington's and Parker's work supplement each other admirably, Parker's outlook being, as we have seen, so commandingly that of the "*neuromuscular mechanism.*"

My next remarks under this subhead call attention to the way in which lack of some such word as conferentiation may not only result, as we have seen, in uses of integration which carry wrong implication, but may also result in similar misfortune as to the use of differentiation.

Consider, for example, the phrase "fully differentiated nervous system," very commonly used to characterize the nervous system of higher animals. A moment's reflection, on the mass of evidence that supports the views here outlined, makes it clear that conferentiatedness is just as fundamentally an attribute of such a nervous system as is differentiatedness. This being so it is next to inevitable that general acceptance of the one word, differentiated, for characterizing the nervous system, should lead to neglect of the fact that the antithetic word conferentiated, or some other meaning the same, is not only equally characterizing for the system, but is really necessary in order that differentiated itself shall have any meaning.

For the general description some phrase like "highly developed" or "highly elaborated" ought, obviously, to be substituted for highly differentiated, thus leaving the door wide open for the perception that the developed or elaborated state is essentially two-fold in character.

I venture to clinch the point to which attention is here called by a single illustration. In the concluding chapter of *The Elementary Nervous System* we read (p. 203): "This most highly differentiated type of the neuromuscular system in which an adjustor or central organ has arisen between receptors and effectors represents the final step in the growth of this group of organs." Is it not clear that the getting "*between* receptors and effectors" and serving so to connect them that the connecting part merits the name adjustor, involves an operation that is the opposite of becoming independent, other, and different? But the essence of differentiation is contained alone in such terms as these three. Consequently, if we start out with a general characterization of the neuromuscular or nervous systems which really has reference only to the separate parts or elements of the system, but then go on to give a characterization of it that refers to an essential uniting of these parts or elements, there is obviously an incompleteness and inconsistency, at least, in the statement. And defective statement of this sort is a fertile source of error both as to fact and as to conception, no less in science than in common knowledge.

What I want particularly to emphasize is that the defectiveness to which attention is called is due not so much to the employment of available terminology as to defect in the terminology itself. Defectiveness from lack of words rather than from choice of words, is what confronts us. It would appear that we have here another instance among the many furnished by the history of science in which investigation brings to light phenomena so remote from ordinary experience that they have not received recognition in common speech.

It remains to notice how relation between muscle and nerve comes into the general scheme of relation among natural bodies, as that was sketched early in this article. The scheme there exhibited was, it will be recalled, made on the basis of the character and extent of the determinative influence which the bodies have on each other, this being a minimum at one extreme (*e.g.*, the influence of gravity on the form and structure of the earth), and a maximum at the other (*e.g.*, the complete obliteration of the identifying attributes of the bodies as in chemical action).

If now one regards from this standpoint the relation between muscle and nerve, and brings these under a single conceptual view, as Parker does, designatable by the expression neuromuscular system, or mechanism, he sees at once that this system's place in the scheme is somewhere midway between the two extremes. A developed muscle, as anatomy and physiology know it, is genuinely itself, and nothing else, and so remains throughout the normal life of the animal to which it belongs, no matter how constantly and vigorously it is acted upon by its nerves; and similarly with the nerves pertaining to that muscle. But at the same time biochemistry, as now developed, leaves no doubt that muscle and nerve are chemically quite different from each other and that both are quite different from the common sensori-motor protoplasmic germ from which they have been derived. And researches such as those of Sherrington, Parker, and Child leave no room for doubt that the difference in structure, function, and chemical composition of the bodies is partly due to their relation to each other—to their action upon each other. Neither could have become what it is all by itself, or independently of the other.

Unquestionably, the muscle as we see it to-day was potential in the contractive aspect of the original protoplasm; and unquestionably, too, the nerve of to-day was potential in the irritable aspect of the same protoplasm. But this potential muscularity and potential neurality of the protoplasm could be brought to reality only by maintaining throughout the evolution the same relation between the two aspects as that which they had in the protoplasmic germ common to the two.

The elaborated neuromuscular system as we see it in higher animals has evolved from its sensori-motor germ by the two-fold process of differentiation and conferentiation.

It is highly desirable to notice finally that such relational and reciprocal action as this is causal, and creative in as fundamental a sense as any action in nature whatever is causal and creative. The ancient notion of Ultimate Causation and Creation, that is, production which is not transformation of something else—production of something now existent from something that previously had no existence whatever—has disappeared from science. In its place has come recognition that since whatever is produced in nature is produced from something else, this something must necessarily have contained potentially that to which it gave rise. In other words, all natural production consists of transformation, this consisting in turn of the coming to actuality of what was before only potentiality. But such transformation seems always to be partly due to "external influences," *i.e.*, to influences of other bodies upon those which are undergoing change. Nothing appears to be capable of transformation, *i.e.*, of actualizing its own potentialities, by its own absolute self. All natural production is partly relational as well as partly individual.

It seems to me that these reflections considerably modify and in so doing clarify such a view as that of John Stuart Mill expressed by the following: "When there is more life in the units there is more in the mass which is composed of them" (*On Liberty*, 9th ed., James R. Osgood and Company, reprint, p. 121). True, so far as it goes, we should have to say; but impotently true without more truth. For, since the "more life of the units" which puts more life into the mass (human social mass, of course, Mill means) is only *potential* life until made *real* life by being acted upon by other units, many of them human individuals, it is quite as true to say "the more life there is in the mass, the more there is in the units which compose it."

The potential life merely as such, of a human individual would seem to be no more significant for the purposes of human life than the potential force, merely as such, of a chunk of coal or a stick of dynamite for the uses to which these bodies are put.

There is nothing more in all this than one characterization in highly generalized terms of what seems to be a truth of all natural phenomena whatever. If this is so it follows that although relation in living nature is so peculiar as to need for its expression a term which our language does not possess, this is after all only another among the various kinds of relation among the elements of nature presented by nature as a whole.

So here, from this standpoint also, as from many others, living bodies are not absolutely unique but are natural bodies differing in kind and degree from those which are not living. But how vastly important difference of kind and degree is when it separates a Shakespeare, a Newton, or a Lincoln, from a crystal, a river, or a planet; or when it separates a Roosevelt alive from a Roosevelt dead!

IV

ILLUSTRATION FROM THE RELATION BETWEEN HUMAN INDIVIDUALS IN SOCIAL GROUPINGS

Useful as the word conferentiate would be for clarifying ideas in anatomy and physiology, it would, I believe, be more widely and practically useful for clarifying ideas in the sciences which deal with the relations among men (humanistic sciences, commonly so called). For if it is true, as a present day school of sociology contends, that the individuals in human society exercise a genuinely determinative or causal influence upon one another, the fact might be expected to have a more fundamental biological basis than any sociologists have yet shown it to have.

In fact, the absence of such showing is to my mind one of the serious defects in the teachings of this school. For even here the reciprocal influence of individuals is held to go no farther than to mental and moral attributes. ''Only in the physical sense of physical bodies that to the senses are separate is individuality an original datum,'' says John Dewey. ''Individuality in a social and moral sense is something to be wrought out'' (*Reconstruction in Philosophy,* p. 194).

I submit that to the philosophical naturalist, the naturalist, that is, whose outlook upon the world is as broadly synthetic as it is deeply analytic, such a gap as is here implied between the physical aspect of the individual on the one hand, and his social and moral aspects on the other, is very disturbing and not to be accepted without the closest scrutiny.

Let us see what such scrutiny finds. To begin with, what about the conception of the physical individual as an ''original datum''? Surely it is not original in the sense of being underived. No one in this day would seriously propose to set aside the vast body of knowledge of biological reproduction, the whole of which denies originality so understood.

But further, what about the social and moral individual as ''something to be wrought out''? Would any educated person of to-day seriously contend that germinal heredity counts for nothing at all in the social and moral individual?

Thus are we confronted at the very outset of our scrutiny of the supposed gap between physical and moral individualities, with the question which, from our previous discussion, arises almost automatically. Has not the elaborative process which has produced human individuals, and which has been so manifestly differentiative, been likewise, though less manifestly, in equal measure conferentiative? If so, having now provided ourselves with a definite criterion of the kind of relation to which it is proposed to apply the word conferentiate, we ought to be able to recognize the consequences of the process in question.

To this end consider that most striking and fundamental of all relations among individuals, the sex relation; and take this first as exhibited in the most highly developed of the human species. What occurs, let us inquire, when two persons, male and female, "fall in love," genuinely, for the first time? Is not every one who has had the experience absolutely certain that there is something about it wholly unique as contrasted with any of his or her previous experiences? And further, does any one doubt for an instant, once attention is called to the point, that it would have been absolutely impossible for either member of the pair to have had the experience independently of the other as inciting cause?

Love without some one to do the loving and also some one to be loved is unthinkable, as Dante was, so far as I know, the first formally to declare. Yet what obscuration of understanding and deprivation of natural joy have been wrought by the independent personification of this the deepest, most intensely human of all man's experiences! Torn from its natural connections, that is, "abstracted" as we say, by the mind, this master passion has been set to wandering about independently and irresponsibly as Cupid or Eros or Freya or some other being, usually good, but sometimes bad, seeking out unwary and helpless humans to bless or curse as whim may dictate.

Now for the point in this of interest to us: If the lover's experience has something about it to him wholly unique, wholly new, surely his relation with his inamorata has influenced him. His individuality has been thus "wrought out" in some degree. But is this influence, this working out of his individuality, entirely social or moral? Or is it entirely physical? Common experience of all normal men and women can be trusted to give the correct answer to these queries, for even abnormal persons act the right answers although they may not express them in language. The ascetic acknowledges even in his condemnation of it, the physical element in his experience; and the rake acknowledges the spiritual element in his experience even by the brutish sentimentalism with which he treats his paramour.

Nor are we any longer in total darkness as to where and how physical and spiritual overlap and interpenetrate in such phenomena. Sentiment, emotion, passion, the main ingredients of love, are the organism's way of reacting when certain stimuli penetrate to certain of the most deeply situated of the organism's members, notably to certain of its glands. And this means, almost certainly, that such reacting involves the metabolism, the chemical processes of these parts.

So in that relation between man and woman known as love our formula gets illustration again: *Though each of the related pair maintains its identity and individuality, that individuality is determinatively influenced even to its chemical structure, by the relation.*

And now let us turn our attention from the operative, the functional aspect of the love relation, to its originative, its genetic aspect. A moment of such attention will suffice if our inquiry goes directly to the kernel of the matter: given all we now know about sex in the whole world, we see that it is not possible even to imagine, consistently with that knowledge, that either male or female could have evolved independently of the other. Their relation is generatively as well as operatively reciprocal. Indeed, it is a commonplace of zoology and botany that in the considerable number of lowly species of both realms where reproduction is mono-genetic (*i.e.*, one-parental), from the standpoint of sex such reproduction can properly be described only as *sexless*. The terms male and female have no meaning whatever for organisms in which reproduction is unqualifiedly of this character.

In the light, consequently, of all our knowledge of reproduction, an adequate biological definition of marriage would run about as follows: A truly natural marriage, one that is based on affection which enduringly affects the two organisms implicated as physical and spiritual wholes, is a kind of relation between the two individuals, man and woman, which has been developed through that particular differentiation and conferentiation known as sex.

If anyone is impelled to grin derisively at this as not only bombast but heartless bombast, I can do no more than say all right, follow your impulse, if only having done this you will then reflect sufficiently on it to discover how much there is in it that is not bombastic and is not heartless.

Of course the funding or pooling by the marriage relation of two lives into a third, a new one, the child, must not be entirely ignored even for a moment, though this aspect of the matter is not of primary concern to us here excepting in so far as it exemplifies the emergence of another order of existence, *the family*, this initiating another phase of animate differentiation implying in turn its appropriate conferentiation.

The relation between individuals having now been illustrated by the instance of marriage, our main purpose here does not demand that any more shall be said about such relation. However, before passing on it seems desirable to refer, very briefly, to the general aspect of the matter. Since the love relation between the individual male and the individual female is after all only a special case, even though one so remarkable and with so much in it that is unique, the type relation being that of reciprocal influence through reciprocal stimulus and response, it is inevitable that the type should manifest itself under various other forms than that of sex love, that is, sex attraction and affection. For example, that the influence should in some instances be the opposite of affection, that is, sex repulsion, would be *a priori* probable. That this probability is abundantly realized does not, unfortunately, need affirming, so obvious is it.

Nor does general knowledge of animate beings, especially as concerning stimulus and response, afford any ground for supposing that reciprocal influence of the type to which sex attraction and sex repulsion belong should be restricted to individuals of different sex. As a matter of fact, there is almost no question that the phenomena of sympathy and of suggestion, especially where these are reciprocal, belong to the same general type of relational action and may be between males and other males, and between females and other females, as well as between males and females. A particularly significant query that presents itself at this point is as to whether love or sympathy or suggestion, when acting in only one direction, that is, only from one individual toward another, with no reciprocation, can be regarded as truly organic and so as conferentiative.

In view of the fact that the illustrations of conferentiation which we have so far noticed almost certainly influence organic parts and the organism clear down to their chemical structure, we can not escape the query, But how, in such phenomena as mutual love and sympathy and suggestion is such influence possible? How, for instance, can we visualize such a purely mental or spiritual thing as love or sympathy as affecting the chemical composition of the persons involved? Well, undoubtedly the problem is one which from the standpoint of chemical technique is so complex and difficult of access as to seem almost beyond hope of successful attack, yet it is not wholly beyond the reach of physiological research. This brings us in sight, so to speak, of the chemistry involved.

The way leading into the problem is, as is now widely known, such work as that which produced the James-Lange theory of emotion, and still more specifically such investigations as those of Cannon (*Bodily Changes in Pain, Fear and Rage*). It would be beyond the aims of the present writing to touch details in this domain. The following remark, designed to furnish a sort of conning tower for viewing the surrounding country, is all that can be given: If we accept the modern theory of descent in its application to man as to the rest of living nature, among the inevitable consequences is that we must conceive the whole of human life, like that of any other kind of life, to involve fundamentally response to the stimulus incident upon contact with the external world; in other words, incident upon the relation existing between the life and its surrounding world. Again this theory requires us to suppose that the literally numberless similarities between individual man and individual man, as also between man as a species and his ancestral species, involve a very great measure of commonness in reaction to the stimuli above indicated. Now it is certain, quite apart from any theory of the origin of living things, that in the whole vast complex which constitutes the external world of any particular organism, only a very small part, relatively, is immediately vital to the organism, and that *small part is identical or very similar for all organisms.* To illustrate, we have only to remind ourselves of the identity of air, water, and sunshine, and the indispensability of these to a vast range of organisms at least, not to mention the similarity of food in the ordinary sense, requisite to all organisms whatever.

Viewed in this way we should say that, given two or more organisms acting as stimuli upon one another, if these organisms are so much alike as are all human organisms, whatever their race or sex, we should expect *a priori,* that the ensuing reactions would have much in common. This is equivalent to saying that *mutual love, sympathy and suggestion are the names given to certain reactions of human beings upon one another when the relation between them is of the conferentiative type.*

From the standpoint of an adequate biology, not only are such phenomena as mutual love, sympathy and suggestion comprehensible, but *it is incomprehensible that they should not exist.*

V

ILLUSTRATION FROM THE RELATION AMONG ORGANIC GROUPS OF INDIVIDUALS

Our example here will be one of relation among political organizations. We will take the thirteen colonies which were the forerunners of the States of our Nation, presenting the case with great brevity.

Having succeeded in separating themselves from the mother country—having been born into the world of political entities—the first period of national infancy was so much differentiated, but so little conferentiated, that political historians hesitate to speak of the States as constituting a nation at all, in that period. Under the Articles of Confederation each of the glorious "Old Thirteen" kept its individuality unimpaired and in this obeyed a general rule of organic development; but efforts of the individual colonies to escape the other equally important rule, that of undergoing determinative modification, were so insistent that it came perilously near succeeding and resulting in the death of the infant. Death-dealing disintegration rather than life-giving conferentiation almost supervened. Fortunately, however, the vitally constructive instincts and intelligence of the people finally prevailed. The interacting units submitted to so much of individual modification as was indispensable to continued life and development of the whole. A truly animate political body was produced, the basis of a real nation, with our Constitution as its organic law. And national life and growth were so far assured.

"So far assured," I say, because this assurance could not, in the very nature of organic life, constitute an assurance for all time. No nation knows its real nature as a living body until it knows that every step of differential growth must have its corresponding step of conferential growth sooner or later if its life is to continue in health and strength and increasing self-realization.

In the proportion that any nation or any individual human is truly conscious of its "destiny," it is conscious that its existence and growth can not consist merely in being big and stout, but must consist as well in perpetual *dif- and con-ferentiation.*

How far down through the scale of constituent elements of an organization like a political body modifying relational influences reach, need not be considered here, our particular point having been made when we have noticed that the proximal elements, the several colonies in our example, underwent, some of them especially, considerable modification, though by no means to the extent of seriously impairing their individuality, as they became merged into the Nation. It may, however, be remarked that in all probability the lives of numerous individual men were modified in no small measure through the adoption of the Constitution and formation of the Nation.

And so we might go on testing all manner of entities in living nature, from toadstools to leagues of nations, by the criterion here employed; and if the testing were always done thoroughly and wisely it would always bring the tested case into somewhat clearer light.

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REVIEWS AND ABSTRACTS OF LITERATURE

Lectures on Modern Idealism. JOSIAH ROYCE. New Haven: Yale University Press. 1919. Pp. xii+266.

In this modest work I feel that we have Royce at his best, engaged in the task in which he was happiest, the task of exposition, and in the field where it is perhaps the most difficult. One thinks always of the beginning student of philosophy as beset by the suspicion that, if the philosopher he is studying knew what he was talking about he would discover that he was talking about—nothing whatever; nothing, at any rate, that means anything for other persons or for common sense. I find myself beset by the same suspicion regarding those who fail to interest me. But I have been too often mistaken not to admit the possibility that there may be no philosophy without some basis in common experience, or in possible experience, if only we could find the peculiar angle of experience from which it was, or (just as good) might have been, written. In such discoveries, such sympathetic interpretations, even if at times a little overdrawn, Royce was especially happy. He was ingenious in showing how the most abstruse problems of philosophy stand for difficulties inherent in common experience. And always to the credit of philosophy; for in his view the philosopher is not merely the plain man with a trifling difference of vocabulary, but rather, with all of his vagueness and confusion, the plain man become really alive and intelligent.

These ten lectures form the chapters of a coherent work, constituting a history of modern idealism, and an analysis of the dialectical movement, through Kant, Fichte, Schelling and Hegel. Thus they cover the ground already covered in Royce's *Spirit of Modern Philosophy.* "To literary distinction such as *The Spirit of Modern Philosophy* possesses," says Dr. Loewenberg in his editorial preface, "the present lectures can evidently lay no claim. In range and depth, however, they far surpass the chronicle of the same period in the earlier volume." For myself, I prefer the style of the *Lectures,* as somewhat more sober and more congenial to the